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Research Article

AN EXPERIMENTAL STUDY- TO EVALUATE THE EFFECT OF *SHATAPUSHPA TAILA* ON ESTROUS PHASE OF FEMALE WISTAR ALBINO RATS

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ABSTRACT

From early adolescence to menopause, the menstrual cycle affects a woman's physiological and psychological health for about 35 to 40 years in a normal population. Properly functioning hypothalamo pituitary ovarian axis, receptive endometrium with healthy ovum and sperm are considered to be the essential factors for conception. Acharyas have quoted *Rutu, Kshetra, Ambhu* and *Beeja* as *Garbha sambhava samagri* which is essential for conception where in *Beeja* can be taken as ovum. *Shatapusha* is mentioned in *Kashyapa samhitha* as *Artavajanaka*, hence an effort to evaluate its effect on estrous phase of female Wistar albino rats is the aim of this study. The selected animal was grouped into four groups with 6 animals each. The animal experiment showed significant increase in estrus phase of the oestrous cycle in rats which is the active phase of mating where the female receives the male.

INTRODUCTION

Normal menstrual cycle is an indication of healthy women owning healthy reproductive organs. The rate of infertility, a major health problem, is steadily increasing due to change in lifestyle, high pollution, socioeconomic cause, stress etc. Among many causes of infertility, Ovarian factor is the most common cause of infertility contributing 25-35% cases of female infertility[1]. Anovulation is most usually diagnosed through manner of way of unusual menstrual intervals, which are normally indicative of altered ovarian cyclicity. Women who exhibit this anovulatory infertility are treated either by hormonal therapy or surgical intervention. In Ayurveda, to achieve pregnancy Sushruta has given 4 crucial elements *Rutu* (fertile period), *Kshetra* (wholesome reproductive organs), *Ambu* (right nutrient fluid), *Beeja* (ovum/sperm)[2] of which one vital element *Beeja*, defect in any one of them can cause *Vandhyatva*.

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Acc. Sushrutha's management with *Agneya gunatmak dravya* act on ovulation, a correction to *Arthava kshaya*[3]. *Shatapushpa* described by Acharya Kashyapa uniquely works on gynecological issues such as *Anartava*, *Kashtartava*, *Arthava kshaya*, *Vandhyatva*[4]. Though traditional drug treatments are located to be powerful in inducing and regularizing menstruation to a positive extent, untoward outcomes of the synthetic drugs, mainly its action on hormones, cannot be ignored. *Kashyapa* has mentioned *Shatapushpa* as drug of choice in *Ritu pravartana* having *Katu-tikta rasa*, *Laghu-teekshna guna*, *Ushna virya* and *Katu vipaka*[5]. Hence, in this study, we aim to assess the impact of herbal drug *Shatapushpa* on estrus phase of female wistar albino rats.

MATERIALS AND METHOD

Experimental Design

Inclusion Criteria

Healthy 24 female wistar albino rats weighing of 200-250gms was selected randomly for the study.

Exclusion Criteria

- Unhealthy and Infected rats
- Pregnant rats
- Wistar rats which are under other experiments

Procedure: The animals were obtained from the animal house attached to the Pharmacology

Laboratory, SDM Centre for Research in Ayurveda and Allied Science, Udyavara. The experiments were carried out in conformity with guidelines of the Institutional Animal Ethical Committee (IAEC) after obtaining its permission.

Ethical Committee Approval Number- SDMCRA/ IARC/PT-01

Animal Grouping: 24 wistar albino rats were selected for the study which were grouped into 4 of 6 rats each.

Test drug: *Shatapushpa taila* is administered internally.

Standard Drug: The positive control group was given with Tab. Ovral-L – Norgestrel 0.3mg and Ethinyl Estradiol 0.03mg.

Dose selection & fixation: Based on the body surface area ratio and by referring to the table of Paget and Barnes (1964).

Dose for rats: Recommended daily intake of *Shatapushpa Taila* = 2 *Pala*

Human Dose X 0.018 for rat weighing 200g

i.e., 48X0.018X5=4.32ml/kg

i.e., 1g=0.00432ml

Drug Administration: Test drug was administered orally including experiment day for 21days in the morning session between 9-10am followed by vaginal smear.

In the 4th group Ovral- L was administered orally between 9-10am following an hour later with *Shatapushpa taila* and vaginal smear was observed.

RESULT

The result of the experimental study on *Shatapushpa taila* have been enumerated as follows.

Table 1: Effect of *Shatapushpa Taila* on Proestrous Phases

Groups	Pro estrous Phases	% Change
Control	3.83 ± 0.54	
Ovral-l	11.66 ± 1.22**	204 ↑#
Shatapushpa taila	4.5 ± 0.80	17 ↑#
Ovral-l + *Shatapushpa taila*	4.33 ± 0.33**	-62 ↓@

Table 2: Effect of *Shatapushpa Taila* on Estrous Phases

Groups	Estrous Phase	% Change
Control	5.33 ± 0.80	
Ovral-l	2.66 ± 0.80	-50 ↓#
Shatapushpa taila	6 ± 0.73	12 ↑#
Ovral-l + *Shatapushpa taila*	9 ± 0.63**	238 ↑@

Table 3: Effect of *Shatapushpa Taila* on Metaestrous Phases

Groups	Metaestrous Phase	% Change
Control	7.83 ± 0.60	
Ovral-l	0.83 ± 0.30**	-89 ↓#
Shatapushpa taila	1.5 ± 0.42 $$	-80 ↓#
Ovral-l + *Shatapushpa taila*	0 ± 0.00	-100 ↓@

Table 4: Effect of *Shatapushpa Taila* on Diestrous Phases

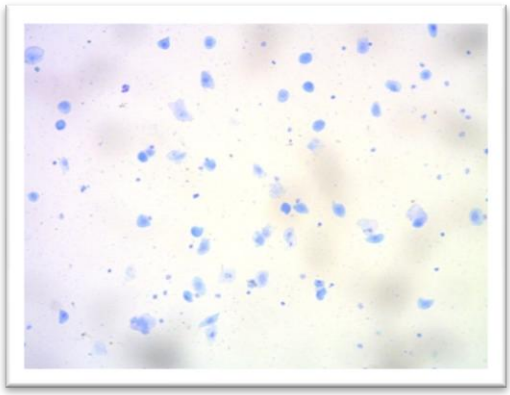
Groups	Diestrous Phase	% Change
Control	4 ± 0.89	
Ovral-l	5.83 ± 1.19	45 ↑#
Shatapushpa taila	9 ± 1.34 $	125 ↑#
Ovral-l + *Shatapushpa taila*	7.83 ± 0.79	34 ↑@

Data: MEAN ± SEM, $p<0.05, **p<0.01, $$P<0.01

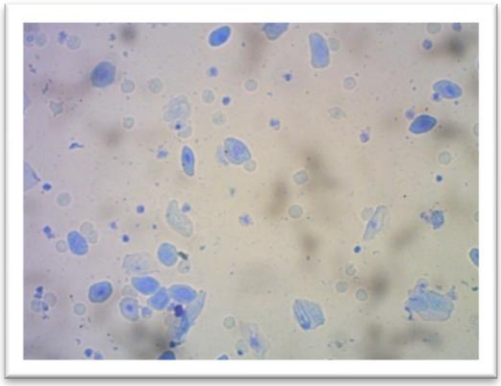
- compared with normal control group

@- compared with ovral-L

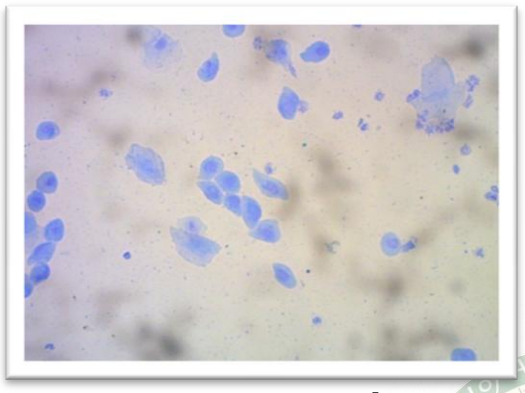
Vaginal Smear of Rat Showing Different Phases of Estrous Cycle



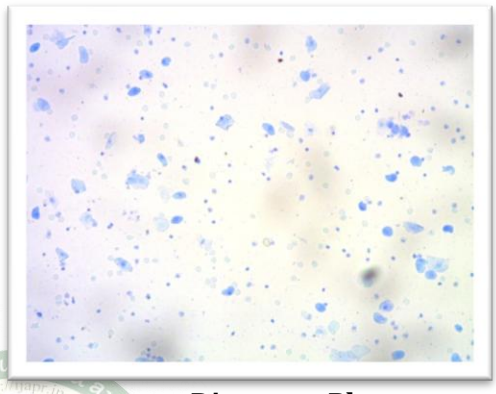
Proestrous Phase



Estrous Phase



Metaestrous Phase



Diestrous Phase

DISCUSSION [6,7]

Proestrus phase: During the proestrus period, LH and FSH make a strong flutter in these rodents. The main function of LH is to induce ovulation, the production of corpus luteum and stimulate the production of ovarian steroid hormones. FSH, on the other hand, stimulates the secretion of estradiol. Estradiol is the main hormone that affects changes in vaginal mucus. Estradiol is at high levels in the proestrus phase and stimulates the release of gonadotropins that cause ovulation. Therefore, at this stage, follicle growth and endometrial development are stimulated by estrogen.

The data showed that there is statistically significant increase in the proestrus phase in Ovral-L group when compared to the normal control group. Indicating the influence of exogenous hormones under the action of ovral- L.

The increase in proestrous phase of *Shatapushpataila* is statistically non-significant when compared to normal control group. Showing the uptake of estrogen for the process of ovulation is minimal.

There was decrease in proestrous phase of ovral-L + *Shatapushpataila* group when compared to positive control group and the decrease was found to be statistically significant. Suggesting the involvement of estrogenic activity of the drug for the process of ovulation by inhibiting the action of drug ovral -L.

Estrus phase: During estrus, with ovulation occurring spontaneously, females are receptive to males, while FHS levels are high at this stage, high FHs levels trigger several morphological changes that lead to ovulation and pregnancy when fertilization occurs. As a result, the corpus luteum becomes functional and secrets progesterone due to surge in LH, which inhibits FSH.

The data showed that there is statistically non-significant decrease in the estrous phase in ovral-L group when compared to the normal control group. Showing the process of follicular maturation with inactive ovulation resulting in less receptivity towards the males due to anovulation.

The increase in estrous phase of *Shatapushpa taila* is statistically non-significant when compared to normal control group suggesting the process of active follicle maturation followed by ovulation with increased receptivity towards male.

There was increase in estrous phase of Ovral-L + *Shatapushpataila* group when compared to positive control group and the increase was found to be statistically significant indicating that the drug *Shatapushpataila* has helped to overcome the process of anovulation induced by the drug Ovral-L by increasing the process of follicular maturation followed by ovulation with the balance in regulation of hormones.

Metaestrus phase: In the metaestrus phase, a corpus luteum is formed and progesterone is produced, but if fertilization does not occur, the corpus luteum ceases to produce progesterone with a slight increase in

estradiol. Progesterone and FSH levels are low in this stage.

The data showed that there is statistically significant decrease in the metaestrous phase in ovral-L group when compared to the normal control group suggesting the absence of formation of corpus luteum due to the anovulatory effect of the drug.

The decrease in metaestrous phase of *Shatapushpataila* is statistically significant when compared to normal control supporting the increased estrus phase.

There was decrease in metaestrous phase of ovral-L + *Shatapushpataila* group when compared to positive control group and the decrease was found to be statistically non-significant.

Diestrus phase: In Diestrus, after the corpus luteum degenerates, progesterone levels plummet. The level of estradiol is at its lowest at this stage. The endometrium doesn't shed off is rebuilt for the next cycle.

The data showed that there is statistically non–significant increase in the Diestrus phase in ovral-L group when compared to the normal control group exhibiting the action of an anovulatory cycle.

The increase in Diestrous phase of *Shatapushpataila* is statistically significant when compared to normal control group due to suggesting increased estrus phase resulted in increased Diestrus phase due to rebuilt of endometrium for implantation.

There was increase in Diestrous phase of ovral-L+ *Shatapushpataila* group when compared to positive control group and the increase was found to be statistically non- significant revealing added effect of test drug over the ovral-L.

CONCLUSION

The physiological changes seen in animals are the concluding factors to understand the intrinsic changes that take place. Studying the estrus phase is one such method to detect the changes taking place in regards to ovulation and conception. The animal experiment showed significant increase in estrus phase of the oestrous cycle in rats which is the active phase of mating where the female receives the male. Showing that the drug *Shatapushpa* had ovulatory effect on the female wistar albino rats.

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